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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* SANTI KULPRATHIPANJA,  
RICHARD E. MARINANGELLI, STEPHEN W. SOHN,  
THOMAS R. FRITSCH, AND R. JOE LAWSON

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Appeal 2009-003781  
Application 10/658,703  
Technology Center 1700

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Decided: March 31, 2010

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Before CHUNG K. PAK, CHARLES F. WARREN, and  
MARK NAGUMO, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge* NAGUMO.

Opinion Concurring filed by *Administrative Patent Judge* PAK, in which  
*Administrative Patent Judge* Warren joins.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

A. Introduction<sup>1</sup>

Santi Kulprathipanja, Richard E. Marinangelli, Stephen W. Sohn, Thomas R. Fritsch, and R. Joe Lawson (“Kulprathipanja”) timely appeal under 35 U.S.C. § 134(a) from the final rejection<sup>2</sup> of claims 1-23. We have jurisdiction under 35 U.S.C. § 6. We REVERSE the rejection of record but enter a new ground of rejection of the independent claims over the art of record.

The subject matter on appeal relates to modified alkylbenzene (“MAB”) compositions containing alkyl groups that are “lightly branched.” Sulfonated products (“MABS”), i.e., phenyl-alkane sulfonic acids, are also covered by certain claims. The MAB are said to be useful as lubricants, while the MABS are said to be useful as deposit-removing additives in engines operating at high temperatures. (Spec. 51.) The MABS are also said to be advantageous over prior art branched alkylbenzenesulfonates (“BABS”) as well as linear alkylbenzenesulfonates (“LABS”) in improved laundry cleaning, hard surface cleaning, and efficiency in both hard and cold water, and to have biodegradability comparable to that of LABS. (*Id.* at 5.)

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<sup>1</sup> Application 10/658,703, *Phenyl-Alkane Compositions Produced Using an Adsorptive Separation Section*, filed 9 September 2003, claiming the benefit via two continuation-in-part applications to 29 December 1998. The specification is referred to as the “703 Specification,” and is cited as “Spec.” The real party in interest is listed as UOP LLC. (Appeal Brief, filed 2 July 2008 (“Br.”), 3.)

<sup>2</sup> Office action mailed 19 October 2007 (“Final Rejection”; cited as “FR”).

In the words of the 703 Specification, a “‘lightly branched paraffin,’ . . . as used herein, refers to a paraffin having three or four primary carbon atoms and for which none of the remaining carbon atoms are quaternary carbon atoms.” (Spec. 10, ll. 19-21.) Linear alkylbenzenes are defined as having “no alkyl group branches, and consequently the linear aliphatic alkyl group normally has two primary carbon atoms.” (*Id.* at 4, ll. 25-27.) The phenyl group in an LAB is said to be typically attached to any secondary carbon atom of the linear aliphatic alkyl group. (*Id.* at 4, l. 27 to 5, l. 1.)

The claims are in product-by-process format, as shown by Representative Claim 1, which is reproduced *infra* from the Claims Appendix to the Principal Brief on Appeal:

1. A modified alkylbenzene composition produced by a process, the process comprising the steps of:
  - a) passing a feed stream  
comprising a lightly branched C<sub>8</sub>-C<sub>28</sub> acyclic paraffin and at least one other acyclic paraffin and having a first concentration of the lightly branched acyclic paraffin  
to an adsorption zone  
comprising a bed of an adsorbent comprising silicalite at adsorption promoting conditions  
to selectively adsorb the lightly branched acyclic paraffin,  
contacting the bed of adsorbent with a desorbent stream  
comprising at least one component selected from the group consisting of a C<sub>5</sub>-C<sub>8</sub> cycloparaffin, a C<sub>5</sub>-C<sub>8</sub> normal paraffin, and a C<sub>5</sub>-C<sub>8</sub> branched paraffin and  
recovering from the adsorption zone  
an adsorption extract having a second concentration of the lightly branched acyclic paraffin that is greater than the first concentration;

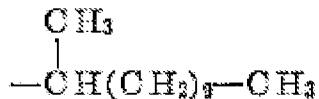
- b) passing at least a portion of the adsorption extract to a dehydrogenation zone,
    - operating the dehydrogenation zone at dehydrogenation conditions sufficient to dehydrogenate the acyclic paraffin,
    - and
    - recovering from the dehydrogenation zone
      - a dehydrogenated product stream comprising a lightly branched C<sub>8</sub> - C<sub>28</sub> acyclic monoolefin;
  - c) passing a feedstock comprising a phenyl compound and passing at least a portion of the dehydrogenated product stream comprising the acyclic lightly branched monoolefin to an alkylation zone,
    - operating the alkylation zone at alkylation conditions sufficient to alkylate the phenyl compound with the lightly branched acyclic monoolefin in the presence of a solid, molecular sieve alkylation catalyst
      - to form phenyl-alkanes comprising molecules having one phenyl portion and one C<sub>8</sub>-C<sub>28</sub> aliphatic alkyl portion;
        - wherein the aliphatic alkyl portion no quaternary carbon atoms except for any quaternary carbon atom bonded by a carbon-carbon bond with a carbon atom of the phenyl portion;
        - and wherein the phenyl-alkanes have selectively to 2-phenyl-alkanes of from about 40 to about 100 and a selectivity to internal quaternary phenyl-alkanes of less than 10; and
  - d) recovering the phenyl-alkanes from the alkylation zone.
- (Claims App., Br. 6, paragraphing and indentation added.)

The Examiner has maintained the following ground of rejection:<sup>3</sup>

Claims 1-23 stand rejected under 35 U.S.C. § 102(b),  
alternatively under 35 U.S.C. § 103(a) in view of Jones.<sup>4</sup>

Initially, we observe that Kulprathipanja and the Examiner do not argue for the patentability or unpatentability of any particular claims separately. The disputed issue is whether Jones describes or suggests lightly branched alkylbenzenes or -alkylbenzene sulfonates.

Kulprathipanja contends the Examiner erred in relying on Jones because Jones uses normal paraffins to make linear, unbranched olefins. (Br., para. bridging 4-5.) Moreover, Kulprathipanja argues that the Examiner's reliance (Ans. 4-5) on the alkyl structure shown at Jones, column 2, line 35, which is reproduced *infra*:



{The figure is said to show a “relatively straight chain structure.”}

(Jones, col. 2, l. 35), is erroneous because that structure is a “linear alkane.”  
(Reply 3.)

The Examiner responds that “[c]learly, the structure in line 35 is a ‘lightly branched C<sub>8</sub> - C<sub>28</sub> acyclic paraffin’ as claimed by the Appellant.”  
(Ans. 6.) Moreover, according to the Examiner,

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<sup>3</sup> Examiner's Answer mailed 16 July 2008 (“Ans.”), 3.

<sup>4</sup> Edwin K. Jones, *Biodegradable Surfactants*, U.S. Patent 3,303,233 (1967) (assigned to Universal Oil Products Co.).

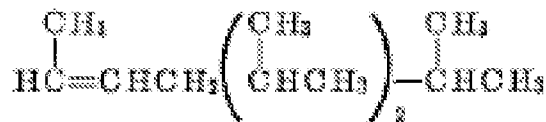
[i]n the event any differences can be shown for the product of the product-by-process claims 1-23, as opposed to the product taught by the reference to Jones, such differences would have been obvious to one of the ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results.”

(*Id.* at 7.) The Examiner does not identify what differences might be shown.

A brief review of Jones shows Kulprathipanja’s arguments are well-grounded. Jones teaches surfactant products “consisting of substantially straight chain alkyl-substituted aromatic compounds.” (Jones, col. 1, ll. 19-21.) Straight chain paraffins are selected, the recovered paraffin is dehydrogenated “to form the corresponding monoolefin, condensing the strain chain olefin with an aromatic compound” (*id.* at ll. 25-28), and the arylalkyl intermediate is then sulfonated. Jones emphasizes that “said straight chain paraffin hydrocarbon” is converted “to an olefin derivative of straight chain structure.” (*Id.* at col. 3, ll. 9-11.) A glance at the structure shown by Jones at column 2, line 35, reproduced *supra*, shows that it has but two primary carbon atoms, not three or four as required by a lightly branched alkylbenzene covered by claim 1. The Examiner has not directed our attention to any credible evidence that Jones teaches or suggests the use of lightly branched acyclic alkylated phenyl groups as that term is defined by the 703 Specification and used in the appealed claims.

New Ground of Rejection

Jones describes “propylene tetramers” as isomers and homologs having a branched chain structure as follows:



{ The figure is said to represent a propylene tetramer. }

(Jones, col. 11, ll. 22-24). (The ordinary chemist would understand, of course, the -CH<sub>2</sub>- group in the left-most “propylene” unit to be extraneous, and the subscript 3 on the hydrogen adjacent the closing parenthesis of the “interior propylene units” to be a typographical error, since -CH<sub>2</sub>- is required.) The propylene tetramer has five primary carbon atoms (-CH<sub>3</sub> groups). The adjacent homologous compound, i.e., the propylene trimer, would have one less primary carbon atom, and hence only four primary carbon atoms. Thus, the propylene trimer is a lightly branched olefin, as defined by the 703 Specification. A person having ordinary skill in the art would have expected such a lightly branched olefin to react with benzene and, upon sulfonation, to provide a useful surfactant. Those reasonable expectations of success render claims to the modified alkyl benzene compositions and to the modified sulfonated alkylbenzene compositions covered by the independent claims obvious in view of Jones.

We note that the claims use the transitional phrase “comprising” throughout. Thus, the claims read on compositions of matter that contain additional materials, and that are produced by additional steps. *See, e.g., In re Baxter*, 656 F.2d 679, 686–87 (CCPA 1981) (“as long as one of the



monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprising’ permits the inclusion of other steps, elements, or materials.”) In other words, as long as a measurable amount of the lightly branched C<sub>8</sub>-C<sub>28</sub> acyclic paraffin is present in the alkylbenzene or alkylbenzene sulphonate composition, the claims are met.

The allegations of equal biodegradability of the lightly branched alkyl group compounds (e.g., Br. 4, 2d full para; Spec. 6, 1st full para) are not substantiated by credible evidence of record, and are not commensurate in scope with the subject matter for which exclusionary property rights are sought. Thus, on the present record, evidence of unexpected results or other secondary considerations do not weigh against the conclusion of obviousness.

We remind the Examiner and Kulprathipanja that although all the independent claims have been rejected, we have not considered the remaining dependent claims. We leave the disposition of those claims to the Examiner in the first instance.

D. Order

We REVERSE the rejection of claims 1-23 under 35 U.S.C. § 102(b), alternatively under 35 U.S.C. § 103(a) in view of Jones.

We enter the following NEW GROUND OF REJECTION:

Claims 1, 16, 17, and 21 are rejected under 35 U.S.C. § 102(b), alternatively under 35 U.S.C. § 103(a) in view of Jones.

This decision contains new grounds of rejection pursuant to 37 C.F.R. § 41.50(b). This section provides that “[a] new ground of rejection... shall not be considered final for judicial review.”

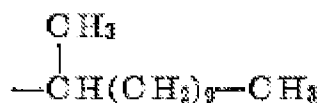
37 C.F.R. § 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new grounds of rejection to avoid termination of the appeal as to the rejected claims:

- (1) Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .
- (2) Request that the proceeding be reheard under § 41.52 by the Board upon the same record . . . .

REVERSED: 37 C.F.R. § 41.50(b)

PAK, *Administrative Patent Judge*, with whom Warren, *Administrative Patent Judge*, joins, concurring.

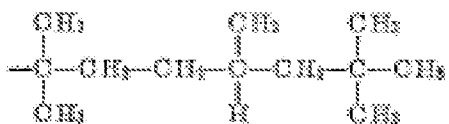
I concur in the opinion of the merits panel, but write separately to further emphasize the obviousness of the claimed invention pursuant to the ground of rejection entered under 37 C.F.R. § 41.50(b). As indicated in the panel's opinion, Jones, like Appellants, describes forming surfactant products having good biodegradability. Jones teaches surfactant products consisting of substantially straight chain alkyl-substituted aromatic compounds. In forming these products, Jones employs a substantially straight chain alkyl compound having at least two primary carbon atoms to form the alkyl chain of the alkyl-substituted aromatic compound. Jones, e.g., col. 2, l. 24 to col. 3, l. 17, col. 3, l. 50 to col. 4, l. 19, and col. 11, ll. 1-24. The resulting substantially straight chain alkyl substituent on the aromatic ring has a structure exemplified by the following structure:



Jones, col. 2, ll. 30-38. This substantially straight chain alkyl substituent results from employing a straight chain alkyl compound having one less primary carbon atom than that required by the claimed "lightly branched" alkyl compound. *See* Spec. 10:19-21; *see also* panel opinion p. 3.

Jones also teaches that the disclosed surfactant products are more likely to be biodegradable than surfactants that contain a more highly

branched alkyl substituent, such as the following highly branched alkyl structure:



Jones, col. 2, ll. 38-46. This highly branched alkyl chain results from a branched alkyl compound that has four more primary carbon atoms than a straight chain alkyl compound and at least two more primary carbon atoms than required by the claimed “lightly branched” alkyl compounds. According to Jones, the highly branched alkyl-substituted aromatic compounds are less biodegradable than the substantially straight chain alkyl-substituted aromatic compounds. Jones, e.g., col. 2, ll. 24-30.

Thus, one of ordinary skill in the art would have reasonably inferred from the above teachings of Jones that “lightly branched” alkyl-substituted aromatic compounds would be useful as surfactant products and would have properties more similar to the substantially straight chain alkyl-substituted aromatic compounds than the highly branched alkyl-substituted aromatic compounds. It follows that one of ordinary skill in the art would have been led to form the claimed “lightly branched” alkyl-substituted benzene compounds, in the reasonable expectation that such compounds would be useful as a surfactant and would have similar properties, including biodegradability, as the substantially straight chain alkyl-substituted aromatic compounds taught by Jones. *See In re Payne*, 606 F.2d 303, 313-14 (CCPA 1979) (“An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make

a claimed compound, in the expectation that compounds similar in structure will have similar properties.”); *see also, e.g., In re Dillon*, 919 F.2d 688, 692-93 (Fed. Cir. 1990)(*in banc*) (“This court . . . reaffirms that structural similarity between claimed and prior art subject matter, proved by combining references or otherwise, where the prior art gives reason or motivation to make the claimed compositions, creates a *prima facie* case of obviousness, and that the burden (and opportunity) then falls on an applicant to rebut that *prima facie* case.”); *In re Grabiak*, 769 F.2d 729, 731-32 (Fed. Cir. 1985) (“[W]e have concluded that generalizations should be avoided insofar as specific chemical structures are alleged to be *prima facie* obvious one from the other. . . . [I]n the case before us there must be adequate support in the prior art for the ester/thioester change in structure, in order to complete the PTO’s *prima facie* case and shift the burden of going forward to the applicant.”); *In re Gyurik*, 596 F.2d 1012, 1018 (CCPA 1979) (When the similarity in chemical structures and functions between the prior art and claimed compounds is sufficiently close, a *prima facie* case of obviousness is established.); *In re Albrecht*, 514 F.2d 1385, 1388 (CCPA 1975); *In re Murch*, 464 F.2d 1051, 1054 (CCPA 1972); *In re Hoch*, 428 F.2d 1341, 1343 (CCPA 1970).

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